Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A WDM layer-based OchP (Optical Channel Protection) device capable of signal transmission through and routing between ~~on~~ working channels and ~~routing selection for~~ protection channels ~~between the transferred traffic and the~~ to/from a WDM system, comprising

a transmitting module and

a receiving module;

the transmitting module and the receiving module each comprising

N working channels to be connected to receiving ends and to transmitting ends of N working channels of the WDM system respectively,

M protection channels to be connected to receiving ends and to transmitting ends of M protection channels ~~in~~ of the WDM system respectively; and

a switching device designed to switch signals in ~~the~~ specified working channels to ~~the~~ specified protection channels and to switch signals in ~~the~~ specified protection channels to ~~the~~ specified working channels according to switching requests from the WDM system; wherein M and N are natural numbers and M<N.

2. (Original) The WDM layer-based OChP device according to claim 1, wherein M is greater than 1.

3. (Original) The WDM layer-based OChP device according to claim 1, wherein the switching device of the transmitting module comprises

N 50:50 couplers and

an NxM optical switch; one of the two output ports of each coupler being connected to a working channel in the WDM system, the other of the two output ports being connected to an input port of the NxM optical switch; M output ports of the NxM optical switch being connected to the M protection channels of the WDM system respectively;

and wherein the switching device of the receiving module comprises

N 50:50 couplers and

an MxN optical switch, one of the two input ports of each coupler being connected to a working channel in the WDM system, and the other of the two input ports being connected to an output port of the MxN optical switch; M input ports of the MxN optical switch being connected to the M protection channels of the WDM system respectively.

4. (Original) The WDM layer-based OChP device according to claim 1, wherein the switching device of the transmitting module comprises

N 1x2 optical switches and

an NxM optical switch, one of the two output ports of each 1x2 optical switch being connected to a working channel in the WDM system, the other of the two output ports being connected to an input port of the NxM optical switch; M output ports of the NxM optical switch being connected to the M protection channels of the WDM system respectively;

and wherein the switching device of the receiving module comprises

N 1x2 optical switches and

an MxN optical switch, one of the two input ports of each 1x2 optical switch being connected to a working channel in the WDM system, the other of the two input ports being connected to an output port of the MxN optical switch, and M input ports of the MxN optical switch being connected to the M protection channels of the WDM system respectively.

5. (Original) The WDM layer-based OChP device according to claim 1, wherein said switching device of said transmitting module comprises

an Nx(N+M) optical switch, the N+M output ports of the Nx(N+M) optical switch being connected to the N working channels and the M protection channels of the WDM system respectively;

and wherein the switching device of the receiving module comprises

an (N+M)xN optical switch, the N+M input ports of the (N+M)xN optical switch being connected to the N working channels and the M protection channels of the WDM system respectively.

6. (Currently Amended) A WDM layer-based OChP method capable of signal transmission through and routing between working channels and protection channels to/from a WDM system, wherein the method uses an OChP device comprising a transmitting module and a receiving module each having N working channels and N protection channels, with M and N being natural numbers and M<N, ~~routing selection for protection channels between the transferred traffic and the WDM system~~, the method comprising the following steps:

monitoring, by the WDM system, ~~of~~ quality of signals in each channel and routing state of ~~OchP~~ the transmitting module and the receiving module ~~modules~~ in the system in real time;

determining, by the WDM system, whether some signals in the working channels are to be switched to the protection channels; and if they are, selecting the protection channels of the WDM system;

sending, by the WDM system, ~~of~~ accurate switching requests to the ~~OchP~~ transmitting module and the ~~OchP~~ receiving module;

performing, by the ~~OchP~~ transmitting module and the ~~OchP~~ receiving module, ~~of~~ switching according to the switching requests from the WDM system[[;]]

~~wherein the WDM system comprises N working channels and M protection channels, M and N being natural numbers, M being less than N~~.

7. (Original) The WDM layer-based OchP method according to claim 6, wherein M is greater than 1.

8. (Currently Amended) The WDM layer-based OchP method according to claim 6, further comprising

determining by the WDM system whether ~~come~~ some signals transmitted in the protection channels are to be switched back to the working channels, and if they are, determining ~~the~~ to which working channel ~~to receive~~ the signals are switched, and sending accurate switching requests to the ~~OchP~~ transmitting module and the ~~OchP~~ receiving module simultaneously.

9. (Original) The WDM layer-based OChP method according to claim 6, wherein when no signals are switched to the protection channels, the protection channels carry traffic with low priority.

10. (Currently Amended) A WDM layer-based optical channel protection device for a multi-channel WDM system comprising

a transmitter comprising

N transmitter inputs;

N working outputs, each working output being connected to the receiving end of a working channel of the WDM system;

M protection outputs, each protection output being connected to the receiving end of a protection channel of the WDM system; and

a transmitter switching unit capable of directing signals from the N signal inputs to the N working outputs and to the M protection outputs;

and a receiver comprising

N receiver outputs;

N working inputs, each working input being connected to the transmitting end of a working channel of the WDM system;

M protection inputs, each protection input being connected to the transmitting end of a protection channel of the WDM system; and

a receiver switching unit capable of directing signals to the N signal outputs from the N working inputs and from the M protection inputs;

wherein the transmitter switching unit and the receiver switching unit are designed to switch signals in specified working channels to specified protection channels or switch signals in specified protection channels back to specified working channels according to switching requests from the WDM system, and M is less than N.

11. (Previously presented) The device of claim 10, wherein M is greater than 1.

12. (Previously presented) The device of claim 10,

wherein the transmitter switching unit comprises

an NxM transmitter optical switch comprising N input ports and M output ports, each output port being coupled to the receiving end of a protection channel of the WDM system and

N transmitter couplers, each transmitter coupler comprising

an input port coupled to a corresponding transmitter input,

a first output port coupled to the receiving end of a working channel of the WDM system, and

a second output port coupled to an input port of the NxM transmitter optical switch;

and wherein the receiver switching unit comprises

an MxN receiver optical switch comprising M input ports and N output ports, each input port being coupled to the transmitting end of a protection channel of the WDM system and

N receiver couplers, each receiver coupler comprising

an output port coupled to a corresponding receiver output,

a first input port coupled to the transmitting end of a working channel of the WDM system, and

a second input port coupled to an output port of the M.times.N receiver optical switch.

13. (Previously presented) The device of claim 10,

wherein the transmitter switching unit comprises

an NxM transmitter optical switch comprising N input ports and M output ports, each output port being coupled to the receiving end of a protection channel of the WDM system and

N transmitter 1x2 optical switches, each transmitter 1x2 optical switch comprising

an input port coupled to a corresponding transmitter input,

a first output port coupled to the receiving end of a working channel of the WDM system, and

a second output port coupled to an input port of the N.times.M transmitter optical switch;

and wherein the receiver switching unit comprises

an MxN receiver optical switch comprising M input ports and N output ports, each input port being coupled to the transmitting end of a protection channel of the WDM system and

N receiver 1x2 optical switches, each receiver 1x2 optical switch comprising

an output port coupled to a corresponding receiver output,

a first input port coupled to the transmitting end of a working channel of the WDM system, and

a second input port coupled to an output port of the MxN receiver optical switch.

14. (Previously presented) The device of claim 10,

wherein the transmitter switching unit comprises

an Nx(N+M) transmitter optical switch comprising

N input ports, each input port being coupled to a corresponding transmitter input,

N output ports, each of the N output ports being coupled to the receiving end of a working channel of the WDM system, and

M output ports, each of the M output ports being coupled to the receiving end of a protection channel of the WDM system

and wherein the receiver switching unit comprises

an (N+M)xN receiver optical switch comprising

N output ports, each output port being coupled to a corresponding receiver output,

N input ports, each of the N input ports being coupled to the transmitting end of a working channel of the WDM system, and

M input ports, each of the M input ports being coupled to the transmitting end of a protection channel of the WDM system.

15. (Currently Amended) A WDM layer-based optical channel protection method for a multi-channel WDM system comprising

monitoring, by the WDM system, quality of signals carried by the channels,

determining, by the WDM system, based on the quality of a signal in a working channel whether to route the signal via a protection channel,

sending, by the WDM system, a first switching request to a transmitter switching unit to route the signal via a protection channel, ~~and~~

sending, by the WDM system, a second switching request to a receiver switching unit to route the signal via a protection channel, and

switching, by the transmitter switching unit or/and the receiver switching unit, the signal in the working channel to a protection channel or switching the signal in the protection channel back to a working channel according to the switching requests from the WDM system,

wherein the multi-channel WDM system comprises N working channels and M protection channels, M being less than N.

16. (Previously presented) The method of claim 15, wherein M is greater than 1.

17. (Previously presented) The method of claim 15, further comprising

determining whether to route a signal on a protection channel via the signal's working channel;

sending a first switching request to a transmitter switching unit to route the signal via the signal's working channel, and

sending a second switching request to a receiver switching unit to route the signal via the signal's working channel.

18. (Previously presented) The method of claim 15, further comprising routing low-priority traffic via the protection channels when the protection channels do not carry signals.